

Serial No. 10/812,132
Customer No. 24498

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Listing and Amendment of the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (CURRENTLY AMENDED) Method A method for pipeline processing a chain of processing instructions, ~~including the step comprising:~~

[[-]] processing said instructions in a chain of succeeding pipeline stages, wherein partial or intermediate first pipeline processing operands or results are intermediately or permanently stored in an operand/result store, ~~e.g. in a register file~~, for further access at the appropriate time instant or instants by one or more of said pipeline stages,

and wherein partial or intermediate second pipeline processing operands or results currently available in one or more of said pipeline stages are accessed by one or more other ones of said pipeline stages at the appropriate time instant or instants without access to said operand/result store,

and wherein a scoreboard is used in which information is stored about the presence or absence of specific ones of said partial or intermediate first pipeline processing operands or results required by subsequent pipeline processing,

and wherein in said scoreboard data are stored and updated about in which one or ones of said pipeline stages a currently required operand or result, or currently required operands or results, is - or are - located and available for use in one or more other ones of said pipeline stages,

and ~~in that~~ in said scoreboard, data are stored and updated about the type of instruction that is related to said currently required operand or result, or currently required operands or results,

wherein said one or more other ones of said pipeline stages makes - or make - use of said data about location and said data about instruction type for accessing directly said currently required operand or result, or currently required operands or results, available in another one or in other ones of said pipeline stages, without need ~~to accessing~~ data stored in said operand/result store.

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2. (CURRENTLY AMENDED) ~~Method~~ The method according to claim 1, wherein said scoreboard contains an individual incrementer for each address of a register in said operand/result store.

3. (CURRENTLY AMENDED) ~~Method~~ The method according to claim 2, wherein the first one of said pipeline stages writes a zero value at the address of a destination register in said scoreboard upon a processing instruction entering said first pipeline stage, and all stage counters related to processing instructions that had previously entered said first pipeline stage are incremented every new cycle if the corresponding pipeline stages are not stalled, such that the current pipeline stage counting number is kept up-to-date, and wherein, upon a processed processing instruction leaving the last pipeline stage of said chain of pipeline stages, said pipeline stage counting number is set to an end value that is no more incremented.

4. (CURRENTLY AMENDED) ~~Method~~ The method according to claim 1 or 2, wherein said chain of pipeline stages, except said first and the last pipeline stage, feed partial or intermediate second pipeline processing operands or results available in one or more of said pipeline stages to a common bus from which said partial or intermediate second pipeline processing operands or results can be accessed by one or more other ones of said pipeline stages at the appropriate time instant or instants without access to said operand/result store.

5. (CURRENTLY AMENDED) ~~Apparatus~~ An apparatus for pipeline processing a chain of processing instructions, and including comprising:

[[-]] an operand/result store;

[[-]] a chain of succeeding pipeline stages, wherein said instructions are processed, ~~whereby~~ and partial or intermediate first pipeline processing operands or results are intermediately or permanently stored in said operand/result store, ~~e.g. in a register file,~~ for further access at the appropriate time instant or instants by one or more of said pipeline stages,

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and wherein partial or intermediate second pipeline processing operands or results currently available in one or more of said pipeline stages are accessed by one or more other ones of said pipeline stages at the appropriate time instant or instants without access to said operand/result store;

[[-]] a scoreboard wherein data are stored and updated about in which one or ones of said pipeline stages a currently required operand or result, or currently required operands or results, is - or are - located and available for use in one or more other ones of said pipeline stages,

and wherein data are stored and updated about the type of instruction that is related to said currently required operand or result, or currently required operands or results,

and wherein said one or more other ones of said pipeline stages use of said data about location and said data about instruction type for accessing directly said currently required operand or result, or currently required operands or results, available in another one or in other ones of said pipeline stages, without need to accessing data stored in said operand/result store.

6. (CURRENTLY AMENDED) ~~Apparatus~~ The apparatus according to claim 5, wherein said scoreboard contains an individual incrementer for each address of a register in said operand/result store.

7. (CURRENTLY AMENDED) ~~Method or~~ The apparatus according to claim 6, wherein the first one of said pipeline stages writes a zero value at the address of a destination register in said scoreboard upon a processing instruction entering said first pipeline stage, and all stage counters related to processing instructions that had previously entered said first pipeline stage are incremented every new cycle if the corresponding pipeline stages are not stalled, such that the current pipeline stage counting number is kept up-to-date, and wherein, upon a processed processing instruction leaving the last pipeline stage of said chain of pipeline stages, said pipeline stage counting number is set to an end value that is no more incremented.

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8. (CURRENTLY AMENDED) ~~Method of~~ The apparatus according to claim 5 or 6, wherein said chain of pipeline stages, except said first and the last pipeline stage, feed partial or intermediate second pipeline processing operands or results available in one or more of said pipeline stages to a common bus from which said partial or intermediate second pipeline processing operands or results can be accessed by one or more other ones of said pipeline stages at the appropriate time instant or instants without access to said operand/result store.